National Academies' Review of the NIOSH Construction Research Program

Goal 1.3: Reduce injuries and fatalities due to struck-by incidents involving vehicles, equipment, and tools

David E. Fosbroke

Statistician (Health)

National Institute for Occupational Safety and Health

def2@cdc.gov

CDC

WORKPLACE SAFETY AND HEALTH

NIOSH

Measures for preventing workers-on-foot from being struck by motor vehicles and equipment.

CDC

NIOSH

Issues

- Contributing factors include the lack of:
  - Lack of knowledge about specific risk factors
  - Lack of scientific assessment of relative risk factors
  - Lack of scientific evaluation of safety interventions
  - Lack of adequate guidelines for controlling vehicle and worker movements inside the work zone
  - Lack of training resources for non-English speaking workers

External Factors

- FHWA and OSHA share responsibility for worker safety in work zones
- Mobile work environment
- Changes in construction workforce demographics and industry organization
- Field-based research is resource-intensive

Activity: Work Zone Safety Data Analysis and Stakeholder Meeting

- Data analysis:
  - ½ the worker fatalities in work zones due to construction vehicles and equipment
- Review of scientific literature and relevant FACE investigations
- 1998 stakeholder meeting

Activity: Field Research

- Field evaluations of prevention measures:
  - Internal traffic control plans (ITCPs)
  - Proximity warning systems (PWS)

- Blind area diagrams for construction equipment

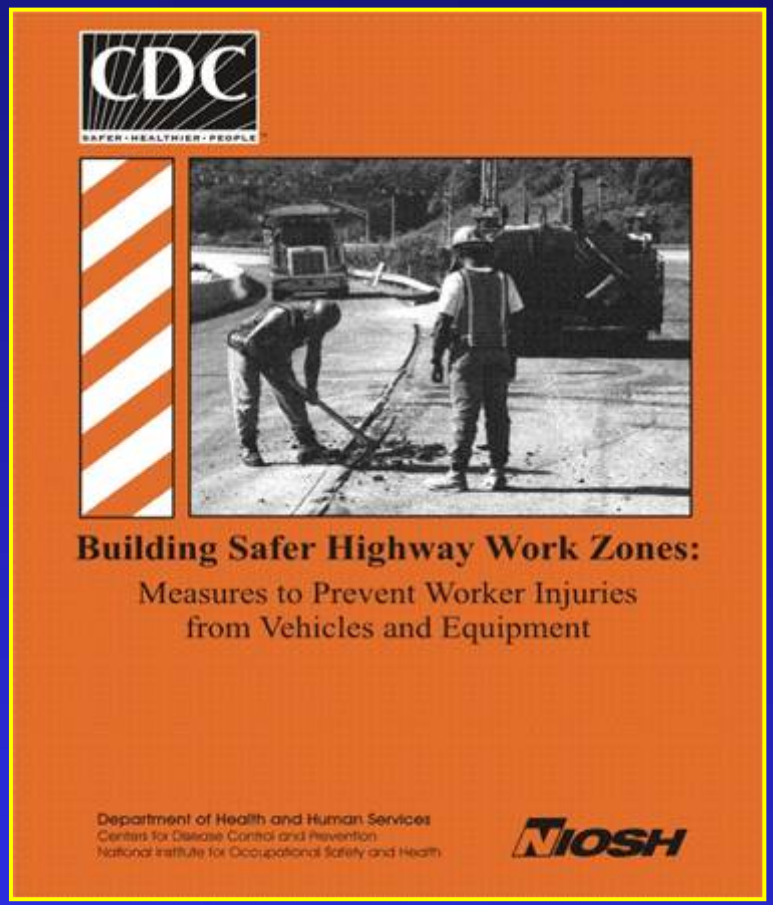
Activity: Field Research

- Evaluation of speed controls
  - Variable message signs
  - Speed bumps

Activity: Field Research

- Night work in roadway construction
  - Worker visibility and lighting
  - PWS effectiveness
  - Traffic control

Output: *Building Safer Highway Work Zones*



- **Measures to reduce worker injuries in highway work zones**
- **Recommendations targeted to specific stakeholders**

Pratt SG, Fosbroke DE, Marsh SM [2001]. Building safer highway work zones: measures to prevent worker injuries from vehicles and equipment. DHHS (NIOSH) Publication No. 2001-128.

CDC

NIOSH

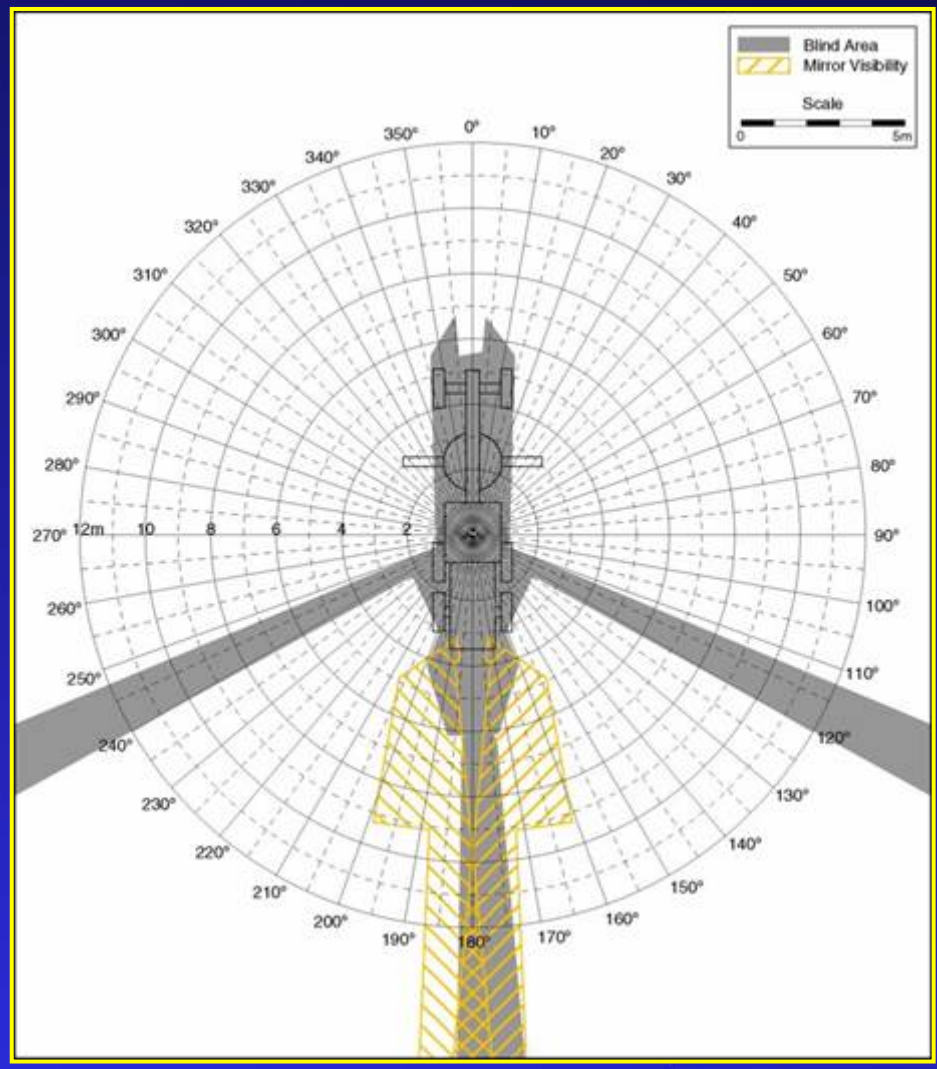
Output: Blind Area Diagrams

- **Collaboration with Caterpillar, Inc. to develop blind area diagrams for construction vehicles and equipment**

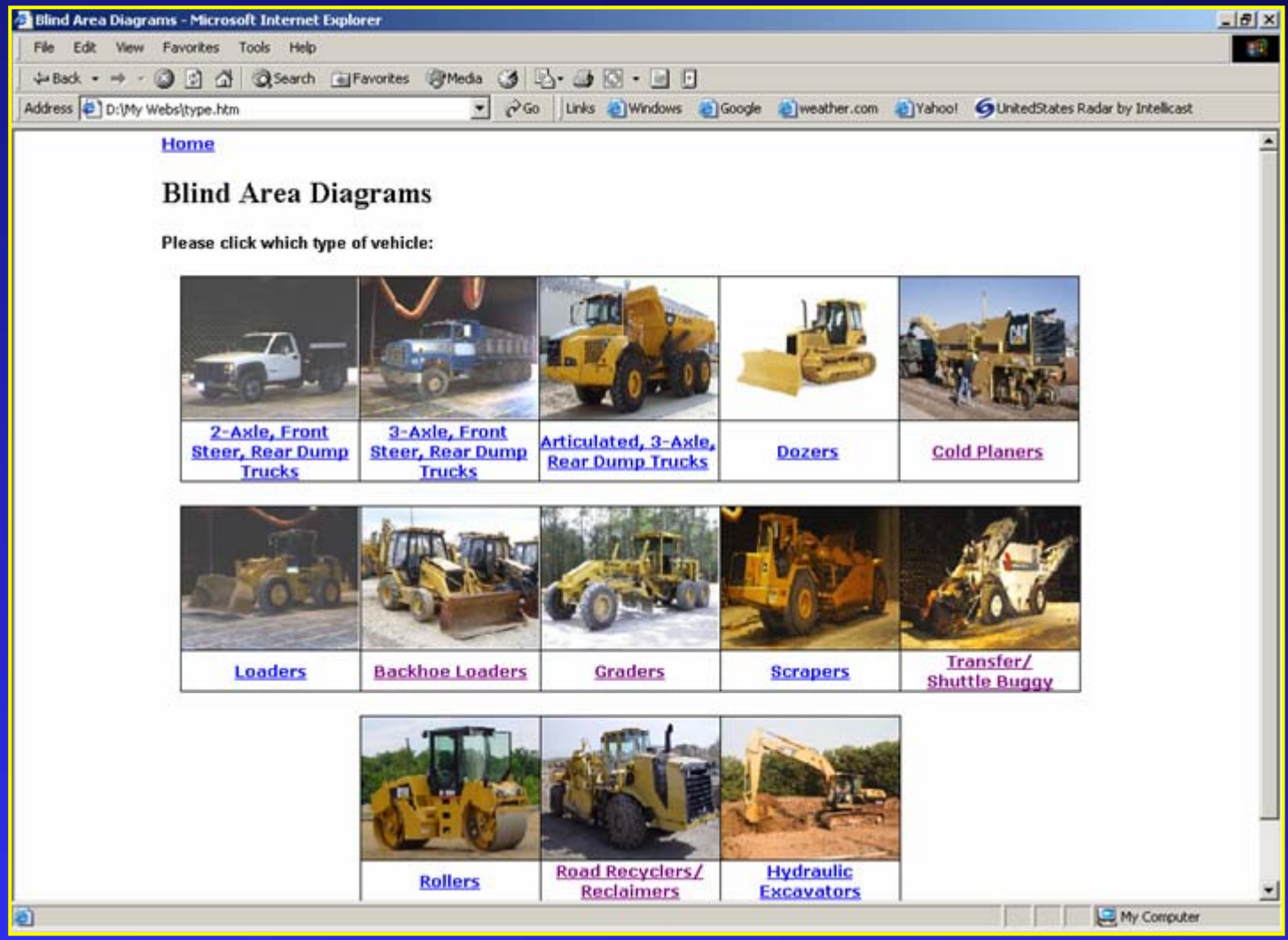
Caterpillar [2003, 2004]. Construction vehicle and equipment blind area diagrams, final reports. Prepared under NIOSH Contract No. 200-2002-00563. Peoria, IL: Caterpillar, Inc.

Blind area

Mirror visibility

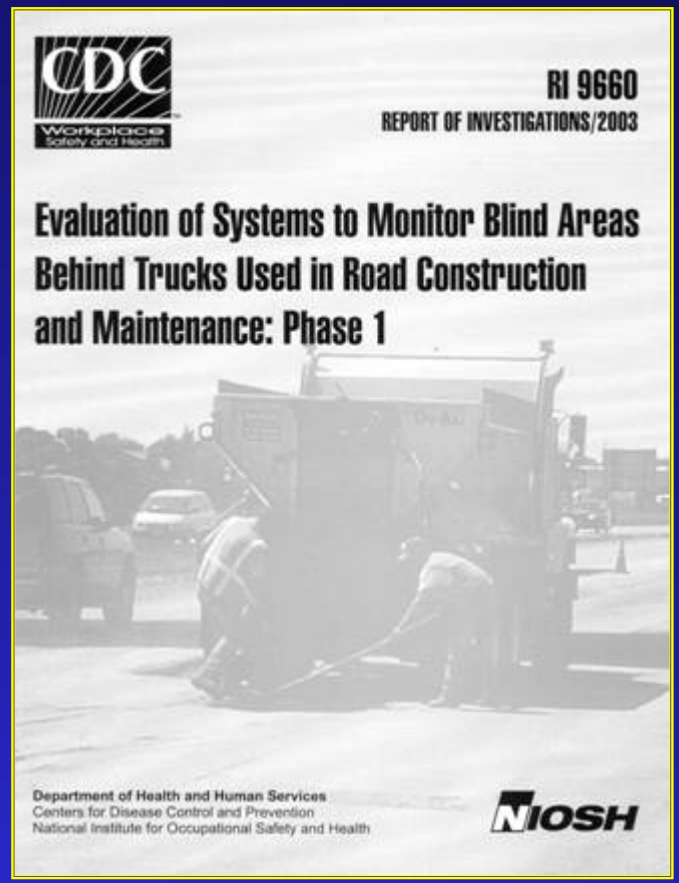


Output: Draft Blind Area Diagram Website



Output: Evaluation Report

- Radar, sonar, and camera systems
  - Feasibility
  - Durability
  - Detection zones

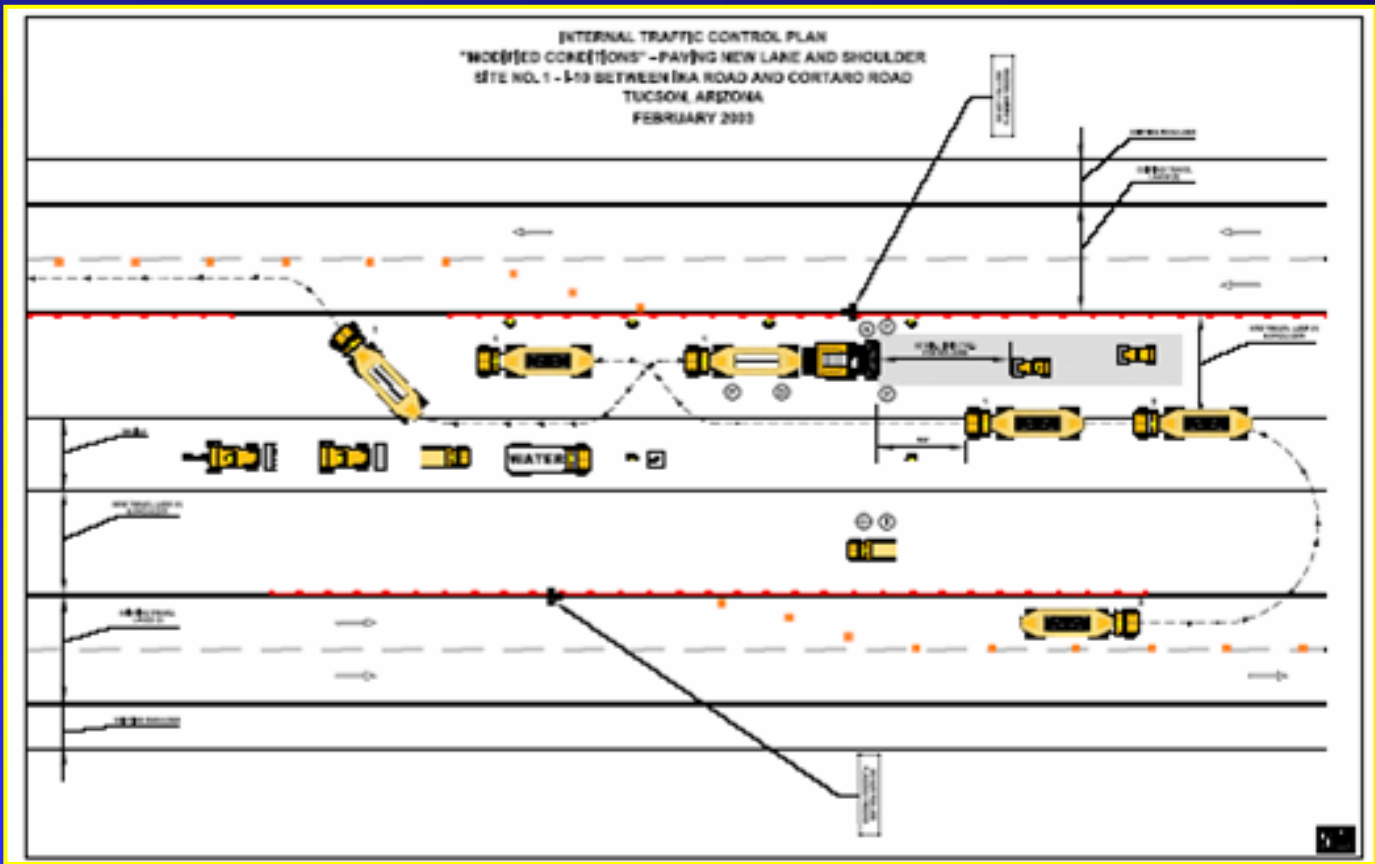


CDC

NIOSH

Output: Internal Traffic Control Plans

- Sample internal traffic control plans (ITCPs)
- Development guide for use by construction contractors



Output: HASARD Adapted for Roadway Construction

- Prototype proximity warning system
- Patents
- Licensing opportunities

Intermediate Outcome: OSHA 10-hour Training Course

- Addresses safety hazards specific to the road construction industry
- Incorporates key measures from *Building Safer Highway Work Zones*
- Available to member companies of ARTBA and NSC Construction Division
- Core component of road construction safety training programs

Intermediate Outcome: Translation of Work Zone Safety Outputs

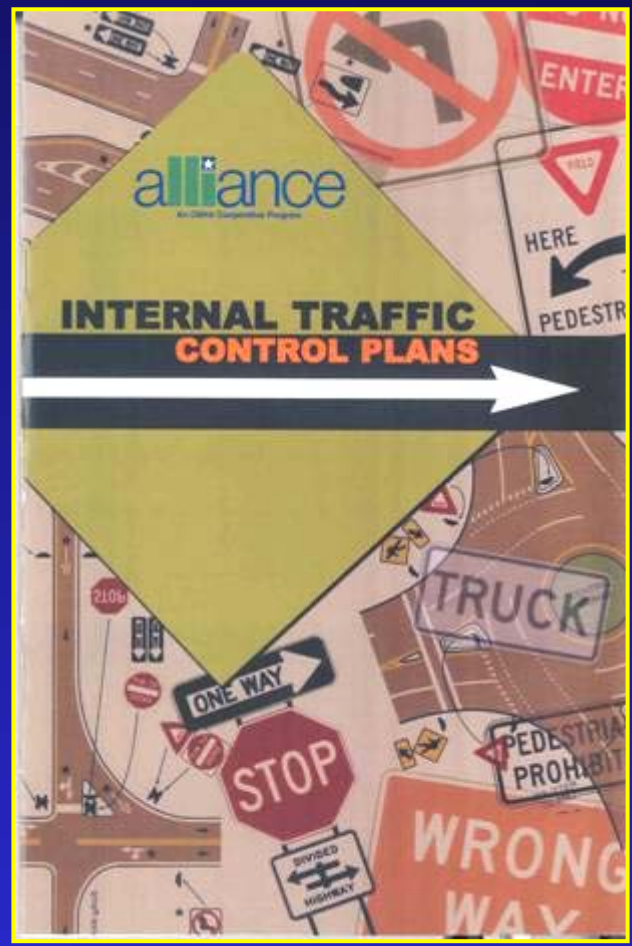
***Building Safer Highway Work Zones*:**

- **Incorporated into work zone safety manual for Laborers' Health and Safety Fund of North America**
- **Used by insurers to provide risk management information to clients**
- **Used to support need for use of high-visibility clothing during disaster clean-up (FEMA)**
- **Incorporated into safety training programs**

Intermediate Outcome: Translation of Work Zone Safety Outputs (cont.)

***Internal Traffic Control Plans*:**

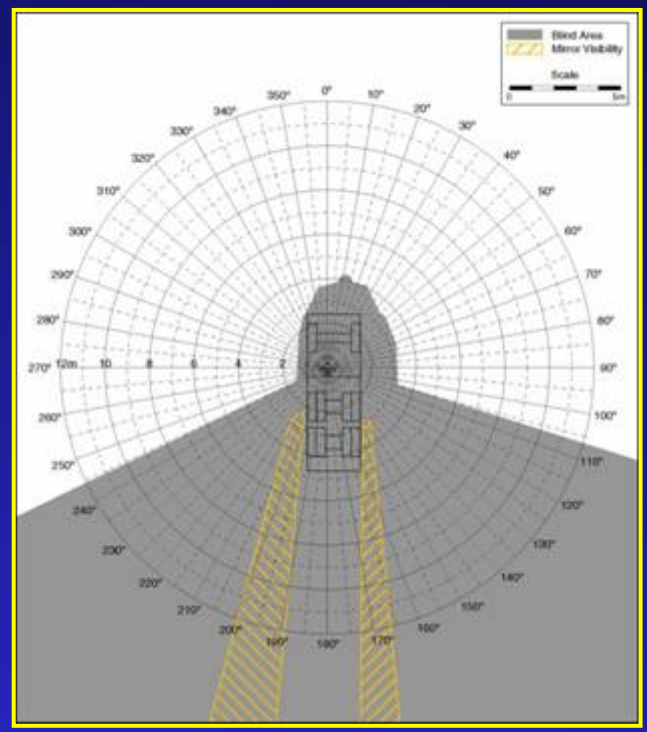
- **Used by Washington State to develop recommendations for internal traffic control**
- **ITCP development guide published by roadway work zone alliance**



Intermediate Outcome: Translation of Work Zone Safety Outputs (cont.)

Blind Area Diagrams:

- **Used by manufacturers of PWS for product development and marketing**
- **Used by individual construction contractors for safety training**



CDC

NIOSH

Intermediate Outcome: Commercial Development of HASARD-based Systems

Licensees:

- **Developed commercial prototypes**
- **Continued testing and evaluation**

Intermediate Outcome: Standards and Guidelines

- Corporate & Union Use
  - Risk management
  - Best practices
  - Training
- Agency Use
  - Select technology
  - Draft road construction regulation
  - Contract language
- Academic Use
  - Curriculum development
  - Strategic planning
- Voluntary Standards
  - ISO 16001
  - ANSI A10.47

CDC

NIOSH

Next Steps

- Renewed OSHA/NIOSH Alliance
- Evaluation of ITCPs on highway construction sites
- Evaluation of emerging technologies related to PWS
- Response to notices of proposed rulemaking

Next Steps

- Support organizations advocating a safe work environment for highway workers
- Support ANSI A10.47 Committee
- Assess training programs for non-English speaking highway workers
- Characterize relative risk of injury during night time construction

CDC

NIOSH

For the Future…

- New and enhanced relationships through NORA
- Continue partnership activities

CDC

NIOSH

Goal 1.3: Reduce injuries and fatalities due to struck-by incidents involving vehicles, equipment, and tools

Fall from Elevation

Electrical Contact

Struck by Vehicle/Equip

Confined Space: Excavation\trenching

Vehicle Rollover

CDC

NIOSH